

29 April 1958

MEMO FOR OPS RECORDS

SUBJECT: Personal Equipment. Visit to Prime Contractor for Oxygen Equipment.

1. Purpose of Visit:

To familiarize manufacturer with field problems encountered in the utilization of their products. Recommend modifications. Study new equipment and developments for possible acceptance by project. The prime contractor for oxygen equipment is the Firewel Co. located in Buffalo, New York.

2. Discussions:

(A) Seat pack and pressure suit hose oxygen connectors --- the design of the present hose connectors is such that the hose connections can be made and safetied pre-take off and still come apart during routine pilot activity in flight. The problem of inadvertent disconnect can effectively be overcome by re-engineering the connectors so that the flat metal pin lock on the female connector be made round. The new connector then could not be hooked up in the midway lock-unlock position. A good connection at time of hook up would be secure and a poor connection impossible. To further assure the security of connections, the male hose connector spring tension must be increased 50%.

Cost. New male connectors for entire project --- \$85. New "T" block oxygen connectors for all suits \$175. Springs for all male connectors \$85. The prime contractor agrees that this modification is a desirable one.

(B) Face Piece Hose Electrical Shorts ---

Shorts in the communication and face heat wires have been of common occurrence. The problem has been isolated and attributed to the thin nylon wire insulation which becomes brittle and cracks in certain temperature and flexibility environments.

A material called "Teflon" for exceeding the attributes of nylon will be used as insulation in all future project face piece hoses. Arrangements have been made with the manufacturer to provide the depot with this new type only on all forth-coming purchases.

(C) Exhalation Valve Modification ---

The serious problem of diaphragm rupture appears to have been solved with the exchange of the latex diaphragm material for silicone. However, the leak free valve seating challenge remains. A new design submitted to the manufacturer was reported to have been studied and proven unsuccessful several months ago. More study is needed for exhalation valve improvement. The valve manufacturer has been familiarized with the valve seating problem.

(D) Face Piece Flight Feeding Orifice Leaks ---

Project decision to seal off the feeding orifice on all project face pieces due to serious leaks was brought to their attention. The UR on this problem submitted in middle April had been received by them and forwarded to the sub contractor responsible for the actual fabrication of the item.

The Firewel Co. agrees that the flight feeding port is of sub par design and further agree with our action to seal the orifice permanently shut. To date no one has come up with a feasible solution to flight feeding problems. It is worthwhile noting that because of inability to solve this problem, the newest A.F. pressure helmets do not have flight feeding facilities incorporated in their design. The next attempt on this subject will be with Wright Field ADC for re-evaluation of flight feeding requirements and methods of adequately satisfying these requirements.

(E) Firewel O<sup>2</sup> Regulator Inspection and Maintenance School ---

Because the F - 2400 regulator is numerically increasing in the A.F., it is felt that military personnel in the P.E. field should be thoroughly trained for field inspection and routine maintenance. No such schooling is available presently in the A.F.. The president of the Co. agrees that the number of F - 2400 Tech Reps cannot continue to increase to satisfy field maintenance and inspection requirements. It was agreed that the Firewel Company would provide an instructor and essential materials and curriculum to teach the F - 2400 regulator in an A.F. Personal Equipment School if contracted to do so.

This subject does not apply to the project directly. We will continue to utilize Firewel Tech Reps. The issue is one of interest to S.A.C.. This information will be provided to the Chief Physiologist of FOG.

(F) Equipment Longevity Table ---

Life expectancy figures for the equipment manufactured by the Firewel Co. were not available from them.

The only assistance they can offer is to proof read the P.E. longevity tables originating from project Hq. and comment on whether or not the figures are realistic. They feel that we are in a better position (after 2 years of operations) to compile equipment life tables.

(G) New Seat Pack O<sup>2</sup> Components ---

LAC has been made responsible for assembling the O<sup>2</sup> equipment components in the new seat pack. This necessitates eliminating the old manifold oxygen supply and replacing it with a single hi pressure container. Firewel Co. states that the pipe thread connection which LAC is using to join the pressure reduction assembly to the emergency oxygen supply will offer serious leak problems. I have asked the Firewel Co. to have their west coast representative (Project Cleared) contact LAC to offer assistance in oxygen matters. Arrangements have also been made for the new seat pack Oxygen Component Assembly to be sent to Firewel for IRAN after the new emergency oxygen supply is connected. If it is true that the problem as above stated may exist, it will be detected and solved when the first regulator assembly reaches Firewel [REDACTED]

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3. New Equipment:

The Firewel Co. in the last year has not come forward with any new equipment that would be of practicability to the project. The oxygen regulator we are now using is still the finest they are producing. Their greatest strides have been in improving the type of equipment that we already have. The F - 2400 regulator (same as project regulator) is being produced 5 ounces less weight, oxygen hoses are produced in silicone rather than latex and the nylon covering for wire insulation is to be repalced with "TEFLON".

Experimentably, they are working on a regulator for the full pressure suit as will be worn in the X - 15 and a global seat ejection survival kit. Both these items are not adaptable at this time to the project.

As a result of this trip we are again assured that the project is not falling behind in the utilization of oxygen equipment of the latest technological improvement. True that there have been minor refinements to the O<sup>2</sup> equipment we have, but these refinements are either worked into our project or if not, are inconsequential or not adaptable to our project. The manufacturer is grasping for any and all suggestions, ideas and new requirements that we may have and pledges full cooperation in all respects.



Aviation Physiologist

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